A Standard Bank-Fund Projection Framework with CGE Features

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by

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Abstract

In this paper, we present a SAM-based methodology for integrating standard CGE features with a macroeconomic World Bank-IMF modelling framework. The resulting macro-micro framework is based on optimising agents, but it retains key features from the macroeconomic model. We highlight that the integrated model is amenable to analyses of issues regarding poverty and income distribution, and present an application where the model is used to study a stylised macroeconomic model growth scenario for Mozambique. The integrated model projections demonstrate that the macroeconomic growth scenario overlooks an undesirable distributional impact. The integrated macroeconomic and CGE model framework is in conclusion identified as a superior modelling tool for analysing growth scenarios.

Keywords: Financial programming, revised minimum standard model (RMSM), macro-micro framework, CGE model, income distribution

JEL classification: D33, D58, E17

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1. Introduction

Growth and development policies for developing countries are often formulated with reference to a macroeconomic analytical framework. In particular, the World Bank (WB) and the International Monetary Fund (IMF) have relied extensively on the financial programming (FP) and the revised minimum standard model (RMSM) during the past four decades as discussed in Agénor and Montiel (1996). On this background repeated calls have been made to put greater emphasis on poverty and distributional implications as evidenced by the recent introduction of Poverty Reduction Strategy Papers (PRSP) as a decision tool for World Bank lending and debt relief to low-income countries. Another illustration is the development of merged macro-micro frameworks like the Integrated Macroeconomic Model for Poverty Analysis (IMMPA) by Agénor, Fofack, and Izquierdo (2002).

The current paper highlights the benefits of integrating a CGE model with a properly specified factor market within any given macroeconomic framework, when focus is on analysing distributional issues. Accordingly, we set out a general Social Accounting Matrix (SAM) framework for integrating core Computable General Equilibrium (CGE) model relationships within macroeconomic model frameworks. Our point of departure is the theoretical model by Khan, Montiel, and Haque (1990) and the simple operational version hereof outlined by Brixen and Tarp (1996). They merge the RMSM and FP model approaches into an overall framework designed to analyse growth-oriented adjustment issues. The merged model inherits the macroeconomic character of the FP and RMSM modelling approaches, but lacks detailed links among projected economic growth, factor remunerations and the distribution of household income. In particular, the merged model fails to account for factor endowments and relative factor returns, rendering it inappropriate as a tool for analysing distributional issues.

We pinpoint the shortcomings of the simple macroeconomic merged model framework, and based on a social accounting matrix (SAM) approach for an adapted version of this model, it is shown that there is a close correspondence between (i) the SAM underlying the real sector of the merged model framework, and (ii) the SAM underlying the static CGE model developed for Mozambique by Arndt, Jensen and Tarp (2000b). In this way we establish a way of combining the two models into a single unified SAM framework. This so-called integrated model addresses the most basic shortcomings of the merged model in relation to analysing distributional issues.

The workings of the integrated model and the differences from the merged model are illustrated through an application using Mozambican data. The application shows that relative prices and developments in factor markets, which are not captured by the merged model, are indeed important. Compared to the simple Bank-Fund merged model, the explicit inclusion of CGE features in the integrated model allows the analyst to focus more sharply on the preconditions regarding factor supplies and productivity underlying projected growth scenarios, and the impact of the growth scenarios on poverty and the distribution of income. Increased detail comes at the expense of harder data requirements. However, the growing availability of SAMs for a wide range of developing countries shows that such data requirements can in many cases be fulfilled without major difficulty. The integration of CGE model features is therefore not only desirable but also a feasible operational proposal for how

to move beyond simple macroeconomic modelling frameworks like the merged model.

Following this introduction, the RMSM, FP and merged model approaches are briefly discussed in Section 2. Subsequently, we present the combined framework of real and financial SAMs for these two models in Section 3. This combined SAM framework is used in Section 4 to formulate the integrated dynamic financial CGE model, and in Section 5 to identify the data necessary to calibrate the parameters of the two models. In Section 6 we present our 1998-2002 economic projections for Mozambique, and conclusions are drawn up in Section 7.

2. The merged model

The macroeconomic modelling framework used in this paper builds as noted on the Brixen and Tarp (1996) operational version of the Khan, Montiel and Haque (1990) merged model. These papers attempted to unite the Revised Minimum Standard Model (RMSM) of the World Bank, and the Financial Programming (FP) modelling approach into a common modelling framework. As such, they attempted to provide a formalized framework, which could be used to evaluate the combined impact of the stabilization and development strategies of the IMF and the World Bank. The equations of the two individual modelling approaches and the merged model framework are presented in appendix A. [2]

The revised minimum standard model (RMSM) is the traditional stylized framework, which the World Bank has used for decades to establish consistent long-term economy-wide growth projections for member countries. The World Bank approach takes an exogenously specified growth path of GDP as starting point in the tradition of Domar (1946), and the supply side is accounted for through a Harrod-Domar type specification of required investment demand. In addition, it includes a balance of payments section, used to derive the implied need for foreign long-term borrowing. Addison (1989) provides an authoritative statement of the RMSM modelling framework, setting out a core set of equations, which describes the fundamental behaviour of the model

A slightly adapted version of the Addison RMSM model is presented in Appendix A. The application of the model relies on a closure, which makes the model solve sequentially. First, the 'final demand' variables are determined. An exogenously specified growth path for GDP, determines import and investment demand, an exogenously specified export growth path determines the trade balance, and the material balance accounting identity determines consumption residually. Subsequently, the 'balance of payments' variables are determined. The trade balance, together with predetermined foreign interest payments and exogenous growth paths for net factor payments and net transfers from abroad, determine the current account of the balance of payments. Moreover, the accumulation of foreign exchange

[2] The merged model presented in Appendix A, is an adaptation of the original merged model proposed by Brixen and Tarp (1996) in so far as (i) private consumption is functionally related to private disposable income, (ii) prices are included in a consistent fashion, distinguishing between deflators for GDP and Absorption, (iii) domestic long-term borrowing is excluded, and (iv) the formulation of income gains from terms-of-trade effects are excluded. In particular, longer-term domestic borrowing was excluded since Mozambican capital markets are very thin.

reserves are determined by a 'capacity to import' equation. The model is closed, by allowing the capital account to adjust through changes in long-term net foreign borrowing. [3]

Financial programming (FP) is the traditional methodology used by the IMF to establish short-term stabilization programs for member countries with balance of payments problems. The methodology, in the tradition of Polak (1957), integrates the monetary sector within the analysis of income and balance of payments developments. The formalized FP modelling framework is based on an exogenously specified GDP growth path, and includes the monetary sector, government accounts and the balance of payments. IMF (1987) presents a formalization of the IMF methodology for assessing the causes and cures of balance of payments problems.

The formalized FP model is presented in Appendix A. The application of the model relies on a highly stylized closure. An exogenously specified GDP growth path determines money demand through a quantity theory specification. Moreover, a given government borrowing requirement and a fixed supply of long-term borrowing determines the demand for government domestic credit. With a given demand for private domestic credit, this will determine total demand for domestic credit and for example the demand for foreign exchange reserves. On the other hand, a given level of export earnings and fixed supplies of private and government long-term borrowing makes the supply of foreign exchange reserves a function of import expenditures. An 'import demand' specification, which acts as a check on the consistency of the demand for foreign exchange reserves, closes the model.

From the discussion of the formalized RMSM and FP models, it follows that the RMSM model is solved sequentially with foreign long-term borrowing as the intermediate target variable. The FP model is, on the other hand solved simultaneously with government domestic credit as intermediate target variable. In merging these two models, Brixen and Tarp (1996) kept the sequential nature of the RMSM model, in so far as the merged model solves for final demand of goods, before solving for money market and balance of payments variables. Moreover, Brixen and Tarp kept the FP specification of government domestic credit as the intermediate target variable of the merged model. The currently used version of the merged model, which is described below, makes use of the same closure rules.

The merged model, presented in Appendix A, combines the formalized RMSM and FP models presented above. Moreover, the model includes prices in a consistent fashion, and disaggregates final demand components between private and government use. While growth paths for individual price indices are imposed exogenously in practical applications, the introduction of relative prices anticipates the inclusion of the CGE model framework below. Disaggregation of final demand components ensures that that calculation of the government's borrowing requirement will be consistent with other government budget items.

In relation to the financial sector, the current merged model framework does not allow for long-term domestic borrowing, since the Mozambican capital market is very thin.

[3] The RMSM model is fundamentally a planning tool, which takes a requirement approach rather than an availabilities approach to policy formulation. Nevertheless, the framework is typically used in an iterative fashion, which supposedly makes it more suitable for making projections. Thus, endogenously determined variables are used as indicators of the relevance of the assumptions about the exogenous variables, e.g. economic growth.

Moreover, interest payments between private and government sectors in relation to domestic credit are not accounted for. This amounts to assuming that all domestic borrowing by the government is made available through money creation by the central bank. Finally, the gains from revaluation of foreign exchange reserves are assumed to accrue solely to the private sector.[4]

3. A comprehensive SAM framework

This section introduces a general SAM framework for incorporating a core CGE model within a given macroeconomic framework. In particular, the formulation of the individual SAM frameworks for our merged model and static CGE model, make it an easy matter to write down the relationship between the savings/investment account(s) of the 'real' SAM underlying the CGE model and the savings/investment account of the 'financial' SAM underlying the merged model. The formulation of this relationship provides the basis for replacing the 'real' side accounting framework of the merged model with the CGE model framework in the next section.

The national accounting identities underlying the merged model can be set out in a combined Social Accounting Matrix (SAM) framework. The 'real' and 'financial' SAM frameworks presented in Appendix B are linked by the savings/investment accounts. The 'real' SAM accounts separately for private and government investment as parts of the individual private and public expenditure patterns. On the other hand, the 'financial' SAM includes only one savings/investment balance, corresponding to the aggregate of the private and government savings/investment accounts from the 'real' SAM. This is sufficient to account for aggregate changes in asset holdings, which arise when total savings are channelled from the initial savers to the ultimate investors.

The national accounting framework underlying the static Mozambican CGE model formulated by Arndt, Jensen and Tarp (2000b) is summarized in the 'real' SAM presented in Appendix C. It corresponds with the 'real' SAM underlying the merged model in so far as it includes separate private and government savings/investment accounts. However, it also has dimensions, which are mainly useful in relation to data handling for CGE models. It distinguishes between production activities and retail commodities in goods markets, and between factor, enterprise and household accounts in the generation and distribution of income.

The distinction between activities and commodities in the market for goods and services is important when the SAM is used as a data organising tool for constructing a CGE model. Accordingly, it allows for the production and retail levels of the marketing chain to be kept separate. Thus, the distinction makes it possible to retain sector-specific information on the costs associated with marketing of goods in a way, which makes it clear that the costs

[4] The revaluation gains from holding foreign exchange reserves are included in the SAM framework of the next section, through the introduction of an artificial capital gains account. Revaluation losses on foreign debt stocks are implicitly accounted for in the private and public savings aggregates, while the overall net capital loss is implicitly accounted for in the current account deficit.

constitute a wedge between producer and consumer prices. Moreover, the distinction is essential to account separately for home consumption of own production and consumption of marketed goods.

Detailed accounts for the income flow from production factors to enterprises and households are another key feature of the 'real' SAM underlying the CGE model. The CGE model is based on a set of production functions, which functionally relates production to inputs of production factors. Several factors of production are typically included since factor intensities differ between production sectors. Moreover, the relative returns to factors are implicitly determined in the model through decisions by profit-maximizing producers and the supply of factors. The relative factor prices determine the changes in the politically sensitive factorial distribution of income. Moreover, the distribution of household income depends on (i) the relative returns among factors, and (ii) the factor endowments of individual agents. Finally, expenditure patterns differ among households. The inclusion of separate factor, enterprise and household accounts therefore make the CGE model framework ideal for analysing the distribution of household income and welfare.

While the distinction between activities and commodities in the goods market and detailed information on the factorial income flow are essential for the CGE modelling approach, these features are not so important in standard macroeconomic models. Typically, they do not distinguish between production and retail levels of the marketing chain, and they pay only scant attention to sector detail. Thus, attention is generally not paid to differential treatment of taxes, and marketing margins and home consumption of own production is not accounted for. There is therefore no need to maintain a distinction between activities and commodities in the SAM framework for an ordinary macroeconomic model. Macroeconomic models also typically operate with aggregate income numbers, where value added at market prices is distributed, directly, among aggregate private and government sectors. There is therefore no need for separate factor, enterprise and household accounts in the SAM framework for an ordinary macro-model, which cannot be used for distributional analyses.

These distinguishing features of the typical macroeconomic model are also characteristic of the merged model. This model incorporates very little sector detail, and relies only on an aggregate resource balance. Nevertheless, there is a one-to-one relationship between the activity and commodity accounts from the CGE model framework and the single aggregate goods account in the merged model framework, as well as between the factor, enterprise, and household accounts from the CGE model framework and the private sector account in the merged model framework. Overall, the dimensions of the 'real' SAM underlying the merged model, presented in Appendix B, corresponds closely to the dimensions of the 'real' SAM underlying the CGE model, presented in Appendix C. The consistency of the underlying accounting frameworks provides the basis for integrating our CGE model within our merged model framework.

4. The integrated model

The discussion in the previous section showed that the integration of the 'real' CGE model framework and the 'financial' asset side of the merged model framework is straightforward. The underlying accounting identities are compatible in the sense that the accounts of the CGE model framework aggregate up to the accounts of the merged model framework.

Moreover, the dimensions of the savings/investment accounts are the same. It follows that the integrated model, where the 'real' side of the merged model are replaced with the CGE model framework, is going to retain the macroeconomic structure and closure of the merged model. Thus, it solves for 'real' goods and factor market variables before solving for 'financial' money market and balance of payments variables. Moreover, domestic credit taking by the government remains the intermediate target variable. [5]

In order to see more specifically how the comprehensive SAM accounting framework is used to arrive at the integrated model, it is useful to summarize the underlying relationships between variables in the integrated model. First, all equations in Appendix D, which are included under the headings of price and quantity equations, income and expenditure equations, market clearing equations and macroeconomic aggregates definitions, relate directly to the static CGE model developed by Arndt, Jensen and Tarp (2000b). Secondly, the equations included under the heading of factor updating equations, relate specifically to the recursive updating of factor stocks. Finally, the equations included under the heading of financial sector variables, relate to the 'financial' sector equations of the merged model (D61-D62 and D67-D72), and to equations defining the relationships between the CGE model variables and merged model variables (D63-D66). The last equations follow immediately from analysing the accounting identities underlying the comprehensive SAM framework, presented in the previous section.

To make it clear how the relationships between CGE and merged model variables are established the accounting identities among the variables of the merged and CGE models are presented in Appendix E and F. As discussed above, we only need to establish the relationships between the variables entering the savings/investment accounts of the respective models in order to link the 'real' sector CGE model to the 'financial' sector of the merged model.

The 'real' side variable relationships of the merged model indicate that the own financing of private capital expenditures, i.e. gross private savings, are made up of net private savings (SP) and private foreign interest payments (INFP). Looking at the savings/investment account of the CGE model, it follows that private gross savings is made up of enterprise and household savings (ENTSAV and HHSAV). Equation (D65) therefore has to be included to ensure that the private supply of gross savings (from the CGE model) is equal to the private demand for gross savings (from the merged model). A similar logic applied to the government sector implies that equation (D66) has to be included to ensure that the government supply of gross savings (from the CGE model) is equal to the government demand for gross savings (from the merged model).[6]

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[5] Government foreign borrowing is controlled by a technical relationship, which specifies the debt stock as a fixed proportion of exports. Thus, the integrated model *de facto* combines the targeting of the intermediate target variables of both the FP and RMSM models. The equations of the integrated model are presented in Appendix D, and the variable definitions are presented in Appendix G.

[6] It is noted that the financial sector of the current model does not keep track of the ownership structure of private assets. This specification was chosen since such information was not available for Mozambique at the time of writing. However, such a specification could easily be incorporated into the model if information becomes available. A full description of the model equations is available in Jensen (1999).

The real side variable relationships of the merged model also indicate that the foreign financing of government capital expenditures amounts to unrequited transfers to the government (NTRG) net of government foreign interest payments (INFG). On the other hand, foreign financing of government capital expenditures is defined as net foreign aid inflows into the government budget (FAIDGIN) in the CGE model. Equation (D64) therefore has to be included, to ensure that net foreign aid inflows (in the CGE model), is consistent with the amount of unrequited transfers (in the merged model). A similar reasoning applied to the private sector implies that equation (D63) is included to ensure that the net foreign savings inflows (from the CGE model) are consistent with the current account balance (from the merged model). [7]

The 'real' sector of the integrated model can be described as a standard 1-2-3 CGE model. It is in the tradition of single-country, two activities, and three commodities models as discussed by Devarajan, Lewis and Robinson (1990). Profit- and utility-maximization characterizes the behaviour of agents, and the Armington-assumption in foreign trade ensures non-specialization in production. Furthermore, the model account explicitly for trade and transportation margins, and home consumption of own production by households. A more elaborate description of the CGE model framework can be found in Arndt, Jensen and Tarp (2000b).

The 'financial' sector of the integrated model has at its core three technical and behavioural relationships. The first defines the government net foreign debt as a fixed share of export earnings. This is a technical relationship, which allows the analyst to implement the assumed impact of debt management strategies, including e.g. the HIPC initiative, in a simple way.[8] The second behavioural relationship defines the accumulation of foreign exchange reserves as a linear function of changes in import expenditures. This specification is supposed to track government objectives regarding the level of foreign exchange reserves in a simple way.[9] The third behavioural relationship defines the demand for money from a simple quantity equation specification.

Overall, the integrated model can be characterized as a projection tool with the same macroeconomic structure as the merged model presented above. Nevertheless, the integrated model differs from the merged model in so far as it explicitly accounts for growth by factor accumulation. While the merged model relies on a Harrod-Domar type 'availability' approach to growth based on a fixed capital-output ratio, the integrated model explicitly accounts for factor accumulation and productivity growth. The integrated model can therefore be used to derive the implicitly assumed TFP growth rates, which underlie any

[7] There is a fifth identity linking variables of the savings/investment accounts of the merged model and the CGE model, which is not included in the model. This relationship would only serve to explicitly define the Government borrowing requirement.

[8] The Mozambican application of the integrated model framework, presented below in section 6, was based on the assumption that the HIPC initiative would have reduced the government net foreign debt to 200 percent of aggregate export earnings in mid-1999.

[9] The current application, presented in section 6, took the stated Mozambican government objective of maintaining foreign exchange reserves to finance five months of additional imports, as a point of departure.

given growth scenario under study.

The integrated model also differs from the merged model as it solves endogenously for relative prices. Imposing a given growth path for the numeraire GDP deflator makes the model solve endogenously for e.g. producer and consumer price aggregates as well as relative producer and consumer prices. In addition, the integrated model solves endogenously for the nominal exchange rate, which serve to equilibrate the current account of the balance of payments.

Finally, the integrated model solves endogenously for relative factor prices, and accordingly for the factorial and household distributions of income. This is important since these twin concepts of income distribution are highly significant from a policy point of view. The factorial income distribution reflects relative returns to factors such as land, labour and capital, making it highly contentious in a political sense. On the other hand, the household distribution of income measures the distribution of welfare among households, making it a primary indicator for fundamental policy objectives such as alleviation of poverty and excessive welfare inequality.

5. Data and calibration

The accounting identities underlying the merged and integrated models were outlined in the presentation of the comprehensive SAM accounting framework in Section 3. The data needed for calibrating the two models can, for the main part, be identified from this framework. Nevertheless, some additional information on the levels of financial aggregates is needed for model calibration. It is important to keep track of the levels of foreign debt stocks since foreign interest payments depend on the level of foreign debt. In addition, the level of government domestic credit typically acts as the key target variable when Bank-Fund models are used to make projections.

The forecast horizon was chosen to be a medium-term 5-year period (1998-2002), enough to analyse the distributional consequences of a set of previously established macroeconomic merged model projections.[10] The data sources used for the current applications of the merged and integrated models include national accounts data from INE (1999a) and government budget data from INE (1999b) as well as monetary surveys and balance of payments data from various publications by the Central Bank (BCM). Since all necessary data were available, the merged model could be calibrated based on a complete 1997 dataset. However, the real sector of the integrated model requires detailed sector information, which was only available from a 1995 SAM. [11] It was therefore decided to calibrate the integrated model to a complete 1995 data set, consisting of the 1995 real sector SAM and a consistent set of financial sector data. Subsequently, the model was run forward to capture key national accounts and financial sector aggregates in 1996-97 without changing

[10] Reliable data on Mozambican national accounts and financial sector aggregates were only available up until 1997 at the time of writing.

[11] The 1995 Mozambican SAM was developed by Arndt, Cruz, Jensen, Robinson and Tarp (1998). A thorough description of the features inherent in the SAM can be found in Arndt, Jensen and Tarp (2000a).

structural details such as input-output coefficients. [12]

The real SAM data set for 1995 was developed with the specific purpose of establishing a comprehensive database with a detailed picture of the agricultural sector. The data set includes 40 production activities, among which 12 primary agricultural sectors and two agricultural processing sectors. Furthermore, the SAM includes 40 retail commodities, three factors of production, including agricultural and non-agricultural labour and capital, and two urban and rural households. This kind of detail is not required for current purposes. The 1995 SAM data was therefore aggregated into four production activities including agriculture, industry, services and marketing services, and three retail commodities including agriculture, industry and services. The disaggregation of factor and household accounts was left unchanged, in order to retain structural detail on the important factorial income distribution matrix.

The running-forward of the integrated model means that the value of some parameters had to change between 1995 and 1997. Nevertheless, there is a set of key parameters that does not change as part of the calibration exercise. One such group of parameters defines technologies used in production activities, including sector shares of intermediate inputs and the factorial distribution of sector value added.[13] The 1995 SAM data set implies that production sectors differ significantly in their relative use of intermediate inputs and primary factors. At one extreme, agricultural production, which is dominated by small-scale peasant farming, stands out as extremely labour-intensive with little use of intermediate input. At the other extreme, marketing service production is very capital-intensive with a reasonably high input cost share.

Another set of parameters, which does not change, is the set of share parameters of the household income distribution matrix. This means that the significant differences in the endowment of factors among households, inherent in the 1995 SAM, are retained. While the majority of value added by agricultural labour is allocated to rural households, mainly small-scale peasant farmers, non-agricultural labour is mainly employed in sectors, which are more naturally situated near urban areas. Nevertheless, since most Mozambicans live in rural areas, rural households receive almost half of value added by non-agricultural labour. Finally, capital possession in Mozambique is mainly a characteristic of urban households, implying that urban households receive the vast majority of value added by capital.

The updating of parameters, which do change value during the calibration of the integrated model, is important since significant changes occurred during 1995-97. The structure of imports changed significantly, but also the domestic propensity to save and inflows of foreign capital changed strongly. Among the parameters which were allowed to vary are the sector productivity parameters, the sector share parameters of the import (CES) and export (CET) functions, and the sector marketing margin rates. In addition, some tax- and savings-rates as well as the coefficients of the three technical and behavioural financial

[12] A full description of the database and the procedure to calibrate the integrated model can be found in Jensen (1999).

[13] As noted below, the only parts of the production technologies that were allowed to change as part of the calibration were the sector productivity parameters.

sector relationships were allowed to vary. Estimated parameters for trade elasticities and minimum consumption level shares were mostly preserved.[14]

6. Merged Model and Integrated Model Projections

This section establishes two consistent sets of merged model and integrated model projection to demonstrate the importance of including CGE model features within the macroeconomic merged model. The discussion in section 4 indicated that the integrated model differs from the merged model as a tool for constructing consistent growth scenarios. The former includes general equilibrium features like price-clearing of goods and factor markets. The merged model is mainly used as a check on the consistency of growth scenarios in relation to private and government spending needs and the availability of financial resources. In contrast, the integrated model allows for additional checks on implied changes in relative prices, implicitly assumed sector growth in factor productivity and implied changes in the distribution of income among factors and households. It follows that the integrated model allows for other points of reflection in addition to traditional target variables like domestic credit expansion.

To illustrate the importance of the CGE model features of the integrated model, it is useful to set out a merged model growth scenario as benchmark. This is done in section 6.1. The benchmark growth scenario takes an optimistic view of the Mozambican economic development over the projection horizon. In particular, the scenario does not include the possibility of a major calamity occurring over the projection period 1998-2002.[15] On the other hand, the merged model projections could be viewed as conservative, since they also exclude the economic impact of so-called mega projects like the revitalization of the Cahorra Bassa dam and construction of the Mozal aluminum production plant. [16]

As a projection tool, the integrated model requires exogenously specified growth paths for certain variables as part of the model closure. An integrated model growth scenario, based on exogenous growth paths from the benchmark merged model projections, is set out in section 6.2. The integrated model projections mimic the merged model projections, and can therefore be viewed as a consistency check of the latter. In particular, it allows for an assessment of alternative policy goals such as the alleviation of poverty and excessive welfare inequality.

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[14] Trade elasticities and minimum consumption levels were estimated for Mozambique by Arndt, Robinson and Tarp (2002).

[15] Further background is available in Jensen and Tarp (2002). They also present a more pessimistic growth scenario based on the occurrence of a major calamity in 2000, mirroring the flooding of parts of Mozambique.

[16] Government revenues from royalty agreements, and expected trickling down in the form of wages paid to locally hired workers, were expected to amount to around 2-5 percent of GDP over the projection period, while profits were expected to be repatriated by foreign owners. The impact of including the large projects in the merged model projections is explored by Jensen and Tarp (2002).

6.1. Merged model projections

In spite of the respectable growth, which characterized the recovery process of Mozambique around the mid-1990s, low levels of income persist, in particular in rural areas, and many structural problems remain to be addressed effectively. Poverty remains widespread and food security issues are important in determining the structure of agricultural production. Furthermore, the government budget has been squeezed to a bare minimum in order to attain balance and comply with the conditions of donor countries. It follows that Mozambique is in need of a broad-based growth process. This is so, in particular, with a view to raising the income for the majority of the population, who live in rural areas, and at the same time increasing government income through goods taxes, which are the only feasible means of raising revenue. The basic premise for the projections that follow was that successful stabilization had paved the way for the economy to move ahead towards a sustainable growth path.

The merged model growth scenario sets merged model parameter values at their 1997 calibrated values with only three exceptions. First, the ratio between foreign exchange reserve accumulation and import growth was assumed to remain constant at 5/12. This was done to reflect the medium term objective of the Mozambican government that foreign exchange reserves should be kept above five months of import expenditures. Second, the technical coefficient relating the foreign debt of the government to export earnings was lowered during 1999-2000 to reflect that government net foreign debt were scheduled to be lowered to 200 percent of export earnings around mid-1999 as part of the HIPC initiative. Finally, the marginal impact of GDP on investment, measuring investments needed to sustain GDP growth, was assumed to average the 1996-97 calibrated values.[17]

The closure of the model implies that exogenous growth paths have to be specified for real exports and GDP. Based on growth paths for sector components of GDP, aggregate GDP growth rates were projected to average 9.3-9.5 percent annually. This corresponds to a continuation of the positive GDP growth trend of the mid-1990s, which was driven by high agricultural growth rates, spurred by good rains, the end to hostilities and recovery from the devastating effects of the 1992 drought. In contrast, growth over the projection period was assumed driven by growth in the industry and service sectors. In particular, the industry sector, which was depressed during the war period as a consequence of lacking intermediate input supplies and devastated distribution networks, had been recently been privatized and restructured. The sector GDP growth paths were assumed to accompany sector export growth paths, corresponding to an average export growth rate of 12.2-13.8 percent over the projection period. Export growth was expected driven by increased exports of manufactured goods and by transit services due to ongoing investment projects to develop the transport corridors running alongside the major east-west rail-lines. The overall export-to-GDP ratio was projected to increase to 18.5 percent in 2002. [18]

[17] Recovery from the war in the early 1990s lowered the coefficient, measuring the marginal impact of GDP on investment, to an unrealistically low level in 1997.

[18] Jensen and Tarp (2002) demonstrate how the inclusion of the projected aluminum exports by Mozal, originally scheduled to start in November 2000, were expected to raise the export-to-GDP ratio to 27.2

The closure of the merged model also implies that several items of the government budget are exogenous. While government tax revenue was assumed to grow in line with nominal GDP, government transfers (to households) were only assumed to increase in line with the GDP deflator. Furthermore, net foreign transfers to the government (i.e. aid inflows) were set to increase modestly at 3 percent annually, implying that government investment expenditures were allowed to expand at 6 percent annually. The three exogenous price indices and the exchange rate were set to increase so as to leave the external terms-of-trade virtually unchanged. Accordingly, while the GDP deflator and the world market import and export prices were set to increase by respectively 5 percent and 3 percent annually, the exchange rate was set to depreciate by 2 percent annually. [19] Aid inflows into the NGO budget were supposed to remain constant in US$-terms as were net factor payments from abroad.

[TABLE 1 ABOUT HERE]

Table 1 presents the merged model projections for final demand in percentage growth rates. It shows that total investment growth needed to underpin GDP growth lie between 7.6-10.4 percent. Since government investment was expected to grow modestly from its high 1997 level, private investment growth lie between 9.3-14.4 percent. These investment growth rates are high compared to the experience of the mid-1990s, but they seemed sensible given the stabilization of the economy and the recent deepening of the financial system, as well as the reestablishment of a reasonable domestic savings rate.

The projections also show that an expansion of government consumption from the 1997 level of 10.2 percent of GDP was a realistic possibility. The government would, however, have to lower consumption growth rates to accommodate stronger private disposable income and consumption growth during 2001-2. Private consumption growth was going to vary with private foreign interest payments. Thus, the debt-servicing ratio was likely to increase since foreign creditors were expected to claim a relatively high share of additional income as businesses started making profits. Import-compression was also important in the years leading up to 1997, but since the economy had already been stabilized further import-compression seemed hard to achieve. The US$-deficit on the trade balance was therefore likely to worsen gradually over the projection period.

[TABLE 2 ABOUT HERE]

Table 2 presents the merged model projections for the balance of payments as a

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percent in 2002. Since exports were significantly affected by the flooding in 2000, the realized export-to-GDP ratio was only estimated to be around 20 percent in 2001.

[19] An impressive decrease of inflation was achieved in the years leading up to 1997. It was therefore decided to impose the official medium-term domestic inflation target of 5 percent over the full projection period. Furthermore, growth paths for import and export prices and the nominal exchange rate, implied a stable real exchange rate over the projection period. In fact, CPI inflation was varying between 10-20 percent during 2000-2002, but continuous exchange rate depreciation has kept the real exchange rate relatively constant.

percentage of GDP. Looking at the current account items, the increasing US$-trade balance deficit correspond to a declining trade balance-to-GDP ratio. However, the relative improvement of the trade balance is not transmitted to the current account. Thus, net factor service income was set to decline because (i) factor payments were set to decline in importance since working opportunities in the South African mining industry were not improving, and (ii) private debt servicing was set to increase. [20] Net foreign transfers to the government, including the expected debt reduction under the HIPC initiative, vary significantly over the projection period. In accordance with one of the key objectives of the Mozambican government, transfers from abroad were, nevertheless, set to decrease strongly, when HIPC related 'transfers' were excluded. Altogether, the relative improvement of the trade balance would not be sufficient to sustain the assumed decrease in aid dependence, as evidenced by the increase in the current account deficit.

Projections for the capital account are also presented in Table 2. As noted above, the government objective of maintaining reserves above five months of imports on a continuous basis was implemented through the assumption that annual changes in reserves would amount to 5/12 of the annual change in the US$-value of imports. [21] Moreover, the government was assumed to be able to obtain foreign loans amounting to 200 percent of the increase in exports earnings every year over the projection period, thereby maintaining the public foreign debt at 200 percent of export earnings. This would allow for a reasonably stable evolvement of private net foreign borrowing, which was expected to peak at 3.6 percent of GDP in 2000.

[TABLE 3 ABOUT HERE]

The total government budget, which is presented in Table 3, remained around 30 percent of GDP during the mid-1990s. However, this share was expected to decrease as a share of GDP over the projection horizon due to modest growth in foreign aid transfers. Aid inflows as a source of government income were projected to decline to a mere 6.5 percent of GDP in 2002, and this was not expected to be made up for by developments in domestically collected revenue. Domestic revenue was projected to grow at rates similar to nominal GDP, implying that available government resources would decline as a share of GDP. Overall, the government budget was therefore going to be reduced to 24 percent of GDP in 2002, which did not seem unreasonable as growth was expected to start picking up.

Table 3 shows that foreign borrowing was expected to remain important for budgetary support. It also shows that the government would only have to rely marginally on domestic financing during 1998-2000, and that it would actually be able to support the

[20] Based on the assumption that Mozambique would be awarded the significant debt reduction, which took place under the HIPC initiative during 1999-2001, a gradual decline in government foreign interest payments was expected to ensue. The decline was, however, assumed to be moderate since debt servicing was expected to increase simultaneously.

[21] The change in reserves made up an almost constant share of GDP over the projection period because of the combination of a constant incremental reserve-to-import ratio and the import demand specification, which almost maintains a constant nominal import-to-GDP ratio.

domestic credit market in 2002. Altogether, nominal domestic credit to the government was projected to remain virtually unchanged between 1997 and 2002 making space for a large concurrent expansion of private sector demand for domestic credit. [22]

[TABLE 4 ABOUT HERE]

Table 4 shows the balance sheet of the banking sector including the central bank. The supply of broad money was expected to grow at the same pace as nominal GDP, reflecting the assumption that the velocity of money circulation would remain constant over the projection period. Since the stock of foreign exchange reserves was set to decline as a share of GDP, domestic credit to the economy was projected to expand strongly. As noted above, this would allow both the private and government sectors to draw increasingly upon domestic resources until the year 2000, after which time the government was projected to start making deposits.

6.2. Integrated model projection

As noted in Section 5, the integrated model was calibrated to target the same 1995-97 data set that was used to calibrate the merged model. It follows that the initial values for the integrated model and merged model projections are basically the same. Furthermore, the integrated model projections require exogenously specified growth paths for certain variables as part of the model closure. These growth paths were all taken from the merged model projections, implying that the integrated model projections mimic the merged model projections of macroeconomic aggregates. The current integrated model projections can therefore be viewed as a consistency check on the merged model growth scenario, and in particular on whether using government domestic credit as an intermediate target variable is appropriate for other policy goals such as alleviation of poverty and excessive welfare inequality. Parameter values were generally fixed over the projection period at the calibrated values for the 1997 base year. [23]

The closure of the integrated model implies, in particular, that the merged model growth paths for real and nominal GDP were targeted over the projection period. The real GDP growth path was exogenously imposed, while nominal GDP was tracked by the choice of the GDP deflator as price numeraire. In addition, nominal government expenditure items, i.e. government consumption and investment, were fixed at their merged model growth paths. Furthermore, the model closure implies that foreign capital inflows in the form of foreign remittances to households, net foreign transfers to the government and NGOs, and

[22] Note that government domestic credit was actually used as an intermediate target variable in the computation of the merged model projections.

[23] The only exceptions were, in line with the calibration of the merged model, the parameters from the financial sector relationships relating accumulation of government net foreign debt and foreign exchange reserves to respectively export and import growth. Government debt accumulation was again assumed to amount to 200 percent of export growth, while reserve accumulation was assumed to amount to five months of additional imports.

foreign savings inflows were all targeted to their respective merged model growth paths. World market prices were also targeted at their merged model growth paths, implying that export and import prices were set to grow uniformly at three percent per year in US$-terms.

Turning to the factor market, labour supplies were assumed to grow at a constant 2.7 percent per year in line with expected population growth. In contrast, the supply of capital was updated from a specification based on a yearly depreciation rate of 6.7 percent and a rate of return to capital of 20 percent.[24] Since the current projections track the merged model growth path for real GDP, the average productivity of production activities had to vary. Since aggregate real GDP was set to grow around 9 percent per year and the capital stock was set to grow around 10 percent per year, average productivity was expected to grow around 4 percent per year. Strong productivity growth was required to make up for the slowly growing labour supply. This conclusion is different from the merged model projections where productivity growth was not seen as a precondition for the specified growth scenario. In addition, capital-intensity of production imply that industry and service sector GDP was set to grow around 10-11 percent per year, while the labour-intensity of agricultural production imply that agricultural sector GDP would grow at a more modest 7 percent per year.

Overall, the specification of the closure implies that most integrated model variables mimic the merged model projections closely. This is, in particular, the case for the overall government budget and individual tax revenue items. But the integrated model projections for imports and exports also remain very close to the merged model growth paths. They only differ slightly since the real exchange rate depreciates by around 1 percent per year in the integrated model projections. Finally, due to the technical and behavioural relationships relating the accumulation of government foreign debt and foreign exchange reserves to export and import growth, projections for foreign debt and domestic credit aggregates as well as other items of the balance of payments was set to develop in a very similar way as well. Having established that the two sets of projections are comparable, we now turn to look at relative prices and the distribution of income among factors and households.

[TABLE 5 ABOUT HERE]

Table 5 presents price developments, which according to the integrated model projections were needed to support the merged model growth scenario. Agricultural price indices generally increase faster than goods prices in other sectors. While agricultural producer prices increase twice as fast as industry and service sector prices, moderate price increases in the marketing service sector imply that agricultural consumer prices increase at a more moderate pace. Nevertheless, they are still increasing considerably faster than other market prices. The strong agricultural price increases follow from increasing demand pressures combined with moderate expansions of agricultural goods supply. While agricultural goods imports increase relatively fast, they only constitute a fraction of total supply. Thus, the supply of agricultural products was going to be constrained by the use of

[24] The choice of depreciation rate reflects the calibrated values of the parameters underlying the Harrod-Domar type growth relationship of the merged model. The estimate of the rate of return to capital is close to the estimate of Arndt, Robinson and Tarp (2001).

very rudimentary production technologies and the moderate expansion of agricultural labour supply. The widening price differentials therefore indicate that there was a potential risk of encountering bottlenecks in relation to the gradual capital deepening of the economy over the projection period.

Agricultural import prices expand much slower than domestic prices, underpinning the relatively strong expansion of agricultural imports. In contrast, agricultural export prices expand at much the same pace as domestic prices, serving to limit the expansion of agricultural exports. For industry goods and services it generally follows that world market prices in domestic currency expand faster than domestic prices. The relative prices changes were generally required to underpin the expansion of agricultural imports at the expense of industry and service sector imports, as well as the expansion of industry and service sector exports to pay for increasing imports. [25]

[TABLE 6 ABOUT HERE]

Developments in factor prices are presented in Table 6. They clearly reflect the limited expansion of labour supply in the current growth scenario. Demand pressures following from the expansion of economy-wide income imply that all demand components were expected to expand quickly. Together with factor productivity growth around 4 percent per year, this causes a relatively strong expansion of factor prices. Moreover, the capital deepening of the economy during the projection period implies that labour wages increase much faster than capital returns. Labour wages increase by between 11-13 percent per year while capital returns only increase by around 5 percent per year. Thus, relative factor returns change strongly in favour of (agricultural) labour wages. This seems to indicate that the factorial income distribution will change in favour of poor rural households with relatively high endowments of labour. However, the capital deepening of the economy actually implies that the factorial income distribution share of capital increases.

[TABLE 7 ABOUT HERE]

The development of the factorial income distribution and the differences in the cost of living indices among households, have implications for the distribution of welfare. This can be seen from Table 7, which presents measures of equivalent variation. While poor rural households do enjoy a significant improvement in welfare, it is smaller than the welfare improvement for urban households. First, the relative increases in agricultural market prices hurt poor rural households since they are characterised by high budget shares of agricultural products. Second, the capital deepening of the economy and the associated increase in the value added share of capital, benefit the more affluent urban households. The integrated model projections therefore indicate that rich urban households were going to benefit the most from the macroeconomic merged model growth scenario. This would raise inequality in terms of income and welfare.

[25] Due to the explicit modelling of marketing margins, relative import and export prices are driven by both the exchange rate and the price of marketing services.

7. Conclusion

Traditional macroeconomic modelling tools for establishing growth scenarios and analysing financial needs of developing countries lack the possibility of analysing issues related to intermediate target variables such as sector terms-of-trade and final target variables such as the distribution of income and welfare. Taking the merged World Bank-IMF model as point of departure, we have demonstrated in this paper how a comprehensive SAM accounting framework can be used as a powerful methodological and data-organizing tool to integrate a general equilibrium model framework within the macroeconomic merged model framework. The integrated model combines the sector detail of the CGE model with the macroeconomic focus of the merged model. In particular, the integrated model allows the modeller to focus not only on traditional target variables such as government domestic credit, but also on more important and fundamental measures like the distribution of income and welfare.

The integrated model was applied to analyse a stylised merged model growth scenario for Mozambique covering the period 1998-2002. Overall, the integrated model projections indicate that the merged model growth scenario is feasible. The implied productivity increases average four percent per year, which is feasible at the current level of development in Mozambique. Furthermore, the projections have the sensible implication that agricultural labour wages are going to increase relatively strongly. Nevertheless, the projections also show that producer price increases spill over into consumer prices for agricultural products, leading to relatively strong increases in rural living costs. Combined with a projected capital deepening of the economy, this implies that the distribution of welfare will change in favour of urban households. Thus, the integrated model projections reveal that the merged model growth scenario, which is based on keeping government domestic credit unchanged, has undesirable distributional implications. In particular, the integrated model projections pinpoint the issue whether poor rural households are going to benefit from the future capital deepening of the Mozambican economy. This seems to require the introduction of improved production technologies in the agricultural sector to take advantage of increasing access to capital.

The integrated model projections expose the weakness of the macroeconomic merged model in terms of analysing distributional issues. Clearly, the aggregation-level of the household sector bars us from using the integrated model to say anything further about issues related to poverty. Nevertheless, the basic model framework can easily be extended to accommodate a more disaggregated household sector. This would allow for more in-depth analyses of specific socio-economic groups. In general, the reliance on general equilibrium features appears as a useful tool for identifying potential problems with growth strategies based on macroeconomic projections. Data requirements are clearly more demanding for the integrated macroeconomic and general equilibrium model as compared to the simple merged FP and RMSM model framework. Nevertheless, SAMs are by now available for a large number of developing countries, so the integration of general equilibrium features within traditional macroeconomic models such as the merged model, represent a feasible and desirable advance.

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Appendix A:

Revised Minimum Standard Model, (Addison, 1989)

$$GDP_t = (1+\gamma_t)*GDP_{t-1} \quad (A1)$$

$$X_t = (1+\lambda_t)*X_{t-1} \quad (A2)$$

$$IV_t = \kappa_0 GDP_{t-1}+\kappa_1 \Delta GDP_t \quad (A3)$$

$$\log(M_t) = \alpha_0+\alpha_1 \log(GDP_t) \quad (A4)$$

$$C_t+IV_t = GDP_t-RESBAL_t \quad (A5)$$

$$RESBAL_t = (XPI_t*X_t-MPI_t*M_t) \quad (A6)$$

$$CURBAL_t = RESBAL_t+NETFSY_t+NTR_t \quad (A7)$$

$$NETFSY_t = NFP_t-INF_t \quad (A8)$$

$$INF_t = IRF_t* NFD_{t-1} \quad (A9)$$

$$CAPBAL_t = \Delta NFD_t+OTHCAP_t \quad (A10)$$

$$\Delta R_t = CURBAL_t+CAPBAL_t \quad (A11)$$

$$\Delta R_t = D_t(MPI_t*M_t-MPI_{t-1}*M_{t-1}) \quad (A12)$$

Financial Programming Model, (IMF, 1987)

$$\Delta M_t = (1/v_t)*\Delta GDP_t \quad (B1)$$

$$\Delta DC_t = \Delta M_t-\Delta R_t \quad (B2)$$

$$\Delta DCG_t = \Delta DC_t-\Delta DCP_t \quad (B3)$$

$$BRG_t = \Delta DCG_t+\Delta NFDG_t \quad (B4)$$

$$\Delta R_t = (EXP_t-IMP_t)+\Delta NFDG_t+\Delta NFDP_t \quad (B5)$$

$$IMP_t = \alpha_t*GDP_t \quad (B6)$$

$$GDP_t = (1+\gamma_t)*GDP_{t-1} \quad (C1)$$

$$X_t = (1+\lambda_t)*X_{t-1} \quad (C2)$$

$$IV_t = \kappa_0 GDP_{t-1}+\kappa_1 \Delta GDP_t \quad (C3)$$

$$\log(M_t) = \alpha_0+\alpha_1 \log(GDP_t)+\alpha_2 \log(E_t*MPI_t/PD_t) \quad (C4)$$

$$P_t*(C_t+IV_t) = PD_t*GDP_t-E_t*RESBAL_t \quad (C5)$$

$$RESBAL_t = (XPI_t*X_t-MPI_t*M_t) \quad (C6)$$

$$IV_t = IVP_t+IVG_t \quad (C7)$$

$$C_t = CP_t+CG_t+CN_t \quad (C8)$$

$$P_t*CP_t = (1-\beta_t)*GDY_t \quad (C9)$$

$$GDY_t = PD_t*GDP_t+E_t*NFP_t+E_t*NTRP_t+(GT_t-TG_t) \quad (C10)$$

$$P_t*CN_t = E_t*NTRNGO_t \quad (C11)$$

$$\Delta R_t = CURBAL_t+\Delta NFDG_t+\Delta NFDP_t \quad (C12)$$

$$CURBAL_t = RESBAL_t+NETFSY_t+NTRG_t+NTRP_t+NTRNGO_t \quad (C13)$$

$$NETFSY_t = NFP_t-INFG_t-INFP_t \quad (C14)$$

$$INFP_t = IRFP_t* NFDP_{t-1} \quad (C15)$$

$$INFG_t = IRFG_t* NFDG_{t-1} \quad (C16)$$

$$NFDG_t = G_t*XPI_t*X_t \quad (C17)$$

$$\Delta R_t = D_t(MPI_t*M_t-MPI_{t-1}*M_{t-1}) \quad (C18)$$

$$BRG_t = P_t*(CG_t+IVG_t)+(GT_t-TG_t)+E_t*(INFG_t-NTRG_t) \quad (C19)$$

$$BRG_t = E_t*\Delta NFDG_t+\Delta DCG_t \quad (C20)$$

$$MD_t = (1/v_t)*GDPN_t \quad (C21)$$

$$GDPN_t = PD_t\ GDP_t \quad (C22)$$

$$\Delta MS_t = \Delta(E_t*R_t)+\Delta DC_t \quad (C23)$$

$$MS_t = MD_t \quad (C24)$$

$$DC_t = DCG_t+DCP_t \quad (C25)$$

$$P_t = \frac{(PD_t*GDP_t+E_t*(MPI_t*M_t-XPI_t*X_t))}{(PD_{1995}*GDP_t+E_{1995}*(MPI_{1995}*M_t-XPI_{1995}*X_t))} \quad (C26)$$

Appendix B:

The 'real' SAM underlying the merged model

Receipts	Outlays							
	1. Production sector	2. Private sector	3. Government Recurrent	4. Government Investment	5. NGO	6. Capital	7. Rest of World	8. Total
1. Production sector		Private Consump.	Government Consump.	Government Investment	NGO Consump.	Non-Government Investment	Exports (FOB)	Final Demand
2. Private recurrent	Value Added at Market Price		Government Transfers				Net Transfers by Workers	Private Income
3. Government Recurrent		Direct and Indirect Taxes						Government Recurrent Receipts
4. Government Investment							Aid in Government Budget	Government Aid Receipts
5. NGO							Aid in NGO Budget	NGO Aid Receipts
6. Capital		Private Gross Savings	Government Gross Savings	Government Investment Budget Deficit			Net Capital Inflow	Total Savings
7. Rest of World	Imports (CIF)							Imports
8. Total	Supply for Final Demand	Private Income Allocated	Government Recurrent Expenditure	Government Investment	NGO Expenditure	Private Investment	Foreign Exchange Available	

The 'financial' SAM underlying the merged model

Liabilities	Assets						
	1. Domestic Money Market	2. Foreign Capital Market	3. Private Investment	4. Government Investment	5. Capital Gains	6. Capital	7. Total
1. Domestic Money Market			Change in Broad Money				Money Demand
2. Foreign Capital Market	Change in Forex Reserves					Current Account Deficit	Demand for Foreign Currency
3. Private Investment	Change in Private Domestic Credit	Change in the Private Foreign Debt			Revaluation of Forex Reserves	Private Savings	Demand for Private Assets
4. Government Investment	Change in Government Domestic Credit	Change in the Government Foreign Debt				Government Savings plus Net Foreign Transfers	Demand for Government Assets
5. Capital Gains	Revaluation of Forex Reserves						Revaluation of Forex Reserves
6. Capital			Private Investment Expenditures	Government Investment Expenditures			Total Investment
7. Total	Money Supply	Supply of Foreign Currency	Supply of Private Assets	Supply of Government Assets	Revaluation of Forex Reserves	Total Savings	

Appendix C:

The 'real' SAM underlying the CGE model												
Receipts	Expenditures											
	1. Activities	2. Commodities	3. Factors	4. Enterprises	5. Households	6. Recurrent Government	7. Indirect Taxes	8. Government Investment	9. NGO	10. Capital	11. Rest of World	12. Total
1. Activities		Marketed Production			Home Consumption							Total Sales
2. Commodities	Intermediate Consumption				Private Marketed Consumption	Government Consumption	Export Subsidies	Government Investment	NGO Consumption	Non-Government Investment	Exports (FOB)	Total Commodity Demand
3. Factors	Value Added at Factor Cost											Value Added at Factor Cost
4. Enterprises			Gross Profits			Subsidies						Enterprise Income
5. Households			Wages incl. Mixed Income	Distributed Profits		Social Security					Net Transfers by Workers	Household Income
6. Recurrent Government		Consumption Taxes	Factor Taxes	Enterprise Taxes	Income Taxes		Indirect Tax Revenue to Government					Government Recurrent Receipts
7. Indirect Taxes	Output Taxes	Import Tariffs										Tariffs plus Output Taxes
8. Government Investment											Aid in Government Budget	Government Aid Receipts
9. NGO											Aid in NGO budget	NGO Aid Receipts
10. Capital				Retained Earnings	Household Savings	Government Savings 1		Government Savings 2			Net Capital Inflow	Total Savings
11. Rest of World		Imports (CIF)										Imports
12. Total	Total Payments	Total Commodity Supply	Value Added at Factor Cost	Enterprise Expenditure	Household Income Allocated	Tax Financed Government Expenditure	Indirect Tax Receipts less Export Subsidies	Government Investment*	NGO Consumption	Non-Government Investment	Foreign Exchange Available	

Appendix D:

Integrated Model

Price equations				
(D1)	$PE_{i,t}$	=	$PWE_{i,t}*EXR_t*(1-te_{i,t})+MRMUL_{i,t}*MRE_{i,t}*PQA_{comma,t}$	Export prices
(D2)	$PM_{i,t}$	=	$PWM_{i,t}*EXR_t*(1+tm_{i,t})+MRM_{i,t}*PQA_{comma,t}$	Import prices
(D3)	$PDC_{i,t}$	=	$PDCH_{i,t}+MRMUL_{i,t}*MRD_{i,t}*PQA_{comma,t}$	Marketed commodity prices
(D4)	$PQQ_{i,t}*QQ_{i,t}$	=	$PDC_{i,t}*DC_{i,t}+PM_{i,t}*M_{i,t}$	Composite commodity prices
(D5)	$PQX_{i,t}*QX_{i,t}$	=	$PDCH_{i,t}*(DC_{i,t}+DCH_{i,t})+PE_{i,t}*E_{i,t}$	Producer commodity prices
(D6)	$PC_{i,t}$	=	$PQQ_{i,t}*(1+tc_{i,t})$	Consumer prices
(D7)	$PQA_{j,t}$	=	$PQX_{i,t}$	Producer activity prices
(D8)	$PV_{j,t}$	=	$PQA_{j,t}*(1-tx_{j,t})-3_i\ a_{i,j}*PC_{i,t}$	Value-added prices net of output taxes
(D9)	$WFLAB_t*FSLAB_t$	=	$3_{lab}\ FS_{lab,t}*WF_{lab,t}$	Composite wage
(D10)	$PINDEX_t$	=	$NGDP_t/RGDP_t$	GDP deflator price index
Quantity equations				
(D11)	$QA_{j,t}$	=	$admul_t*ad_{j,t}*\vartheta_f\ FDSC_{j,f,t}^{\ \alpha}$	Cobb-Douglas production function
(D12)	$INT_{i,t}$	=	$3_j\ a_{i,j}*QA_{j,t}$	Total intermediate use
(D13)	$QA_{j,t}$	$\exists$	$risklow_{j,t}$	Risk related minimum production
(D14)	$WF_{f,t}*WFDIST_{j,f,t}*FDSC_{j,f,t}$	=	$RISK_{j,t}*QA_{j,t}*PV_{j,t}*\alpha_{f,t}$	Demand function for primary factors (profit maximization)
(D15)	$FSLAB_t$	=	$af*(\tau*FS_{"aglab",t}^{\ rhof}+(1-\tau)FS_{"naglab",t}^{\ rhof})^{1/rhof}$	Composite labor
(D16)	$FS_{"aglab",t}$	=	$FS_{"naglab",t}*((WF_{"naglab",t}/WF_{"aglab",t})(\tau/(1-\tau)))^{1/(1-rhof)}$	Agricultural labor supply
(D17)	$QA_{comma,t}$	=	$3_i(MRM_{i,t}*M_{i,t}+MRMUL_{i,t}*(MRE_{i,t}*E_{i,t}+MRD_{i,t}*DC_{i,t}))$	Commodity/marketing services relationship
(D18)	$QX_{i,t}$	=	$3_{j\ \mid\ map(i,j)}\ QA_{j,t}$	Commodity/activity relationship
(D19)	$QX_{ie,t}$	=	$at_{ie}*(\gamma_{ie,t}*E_{ie,t}^{\ rhot}+(1-\gamma_{ie,t})*(DCH_{ie,t}+DC_{ie,t})^{rhot})^{1/rhot}$	Gross domestic output as a composite good for ie 0 i
(D20)	$E_{ie,t}$	=	$(DCH_{ie,t}+DC_{ie,t})*((PDCH_{ie,t}/PE_{ie,t})*(\gamma_{ie,t}/(1-\gamma_{ie,t})))^{1/(1-rhot)}$	Export supply for ie 0 i
(D21)	$QX_{ien,t}$	=	$DCH_{ien,t}+DC_{ien,t}$	Gross domestic output for ien 0 i
(D22)	$QQ_{im,t}$	=	$ac_{im}*(\delta_{im,t}*M_{im,t}^{\ -rhoc}+(1-\delta_{im,t})*(DCH_{im,t}+DC_{im,t})^{-rhoc})^{(-1/rhot)}$	Total supply of composite good - Armington function for im 0 i
(D23)	$M_{im,t}$	=	$DC_{im,t}*((PDC_{im,t}/PM_{im,t})*(\delta_{im,t}/(1-\delta_{im,t})))^{1/(1+rhoc)}$	F.O.C for cost minimization for composite good for im 0 i
(D24)	$QQ_{imn,t}$	=	$DC_{imn,t}$	Total supply for imn 0 i

Income equations

(D25)	$YFCTR_{f,t}$	=	$WF_{f,t}*3_j\ WFDIST_{j,f,t}*FDSC_{j,f,t}/RISK_{j,t}$	Factor income
(D26)	$Yinstp_{instp,t}$	=	$3_f\ YFCTR_{f,t}*ymap_{instp,f}*((1-(TRADD_t+TF_{f,t}))/(1-tfb_t))$	Private institutional income
(D27)	YE_t	=	$Yinstp_{"enterp",t}+GOVTE_t$	Enterprise income
(D28)	$YH_{hh,t}$	=	$Yinstp_{hh,t}+sdistr_{hh}*DISTR_t+$ $sremit_{hh,t}*REMIT_t*EXR_t+strans_{hh}*GOVTH_t$	Household income
(D29)	$INDTAX_t$	=	$3_j\ tx_{j,t}*PQA_{j,t}*QA_{j,t}$	Indirect taxes on domestic production
(D30)	$EXPTAX_t$	=	$3_i\ te_{i,t}*EXR_t*PWE_{i,t}*E_{i,t}$	Export taxes
(D31)	$TARIFF_t$	=	$3_i\ tm_{i,t}*EXR_t*PWM_{i,t}*M_{i,t}$	Import tariff revenue
(D32)	$CONTAX_t$	=	$3_i\ tc_{i,t}*PQQ_{i,t}*QQ_{i,t}$	Consumption taxes
(D33)	$FACTAX_t$	=	$3_f(tf_{f,t}+TRADD_t)*YFCTR_{f,t}$	Factor taxes
(D34)	$ENTTAX_t$	=	$3_i(etr_t+TRADD_t)*YE_t$	Enterprise taxes
(D35)	$HHTAX_t$	=	$3_{hh}(th_{hh,t}+TRADD_t)*YH_{hh,t}$	Household taxes
(D36)	$ENTSAV_t$	=	$(esr_t+SRADD_t)*(YE_t-ENTTAX_t)$	Enterprise savings
(D37)	$HHSAV_t$	=	$3_{hh}(mps_{hh,t}+SRADD_t)*YH_{hh,t}*(1-(th_{hh,t}+TRADD_t))$	Household savings
(D38)	$GREREV_t$	=	$INDTAX_t+EXPTAX_t+TARIFF_t+CONTAX_t+$ $FACTAX_t+ENTTAX_t+HHTAX_t$	Government recurrent account revenue
(D39)	$GINREV_t$	=	$FAIDGIN_t*EXR_t$	Government investment account revenue
(D40)	$NGOREV_t$	=	$FAIDNGO_t*EXR_t$	Non government organization account revenue
(D41)	$SAVING_t$	=	$ENTSAV_t+HHSAV_t+GRESAV_t+GINSAV_t+FSAV_t*EXR_t$	Total private savings

Expenditure equations

(D42)	$PC_{i,t}*(CDM_{i,hh,t}-\gamma_{i,hh,t}^{\ m})$	=	$\beta_{i,hh,t}^{\ m}*((1-(mps_{hh,t}+SRADD_t))*YH_{hh,t}*(1-(th_{hh,t}+TRADD_t))-3_{i1}(PC_{i1,t}*\gamma_{i1,hh,t}^{\ m}-PDCH_{i1,t}*\gamma_{i1,hh,t}^{\ h})$	Private consumption for marketed commodities
(D43)	$PDCH_{i,t}*(CDH_{i,hh,t}-\gamma_{i,hh,t}^{\ h})$	=	$\beta_{i,hh,t}^{\ h}*((1-(mps_{hh,t}+SRADD_t))*YH_{hh,t}*(1-(th_{hh,t}+TRADD_t))-3_{i1}(PC_{i1,t}*\gamma_{i1,hh,t}^{\ m}-PDCH_{i1,t}*\gamma_{i1,hh,t}^{\ h})$	Private consumption behavior for home consumption
(D44)	$PC_{i,t}*GD_{i,t}$	=	$gles_t*(GDTOT_t+((gdtot0/(gdtot0+gininv0))*3_{i1}\ PC_{i1,t}*foodaid_{i1,t})$	Government consumption
(D45)	$GREREV_t$	=	$GDTOT_t+GOVTE_t+GOVTH_t+GRESAV_t$	Government recurrent budget constraint
(D46)	$PC_{i,t}*GI_{i,t}$	=	$gishr_i*(GININV_t+((gininv0/(gdtot0+gininv0))*3_{i1}\ PC_{i1,t}*foodaid_{i1,t})$	Real government investment
(D47)	$GINREV_t$	=	$GININV_t+GINSAV_t$	Government investment budget constraint
(D48)	YE_t	=	$DISTR_t+ENTTAX_t+ENTSAV_t$	Enterprise expenditure
(D49)	$PC_{i,t}*NGOD_{i,t}$	=	$ngoshr_i*NGOREV_t$	Non government organization consumption
(D50)	$PC_{i,t}*CI_{i,t}$	=	$cishr_i*CAPINV_t$	Private investment
(D51)	$ID_{i,t}$	=	$CI_{i,t}+GI_{i,t}$	Investment by sector of origin
(D52)	$HHCONS_{hh,t}$	=	$3_i\ (PDCH_{i,t}*CDH_{i,hh,t}+PC_{i,t}*CDM_{i,hh,t})$	Household consumption

Market clearing equations				
(D53)	$QQ_{i,t}+foodaid_{i,t}$	=	$INT_{i,t}+3_{hh}CDM_{i,hh,t}+GD_{i,t}+NGOD_{i,t}+ID_{i,t}$	Commodities market equilibrium
(D54)	$DCH_{i,t}$	=	$3_{hh}\ CDH_{i,hh,t}$	Home consumption equilibrium
(D55)	$FS_{f,t}$	=	$3_j\ FDSC_{j,f,t}$	Factor market equilibrium
(D56)	$3_i\ PWM_{i,t}*M_{i,t}$	=	$3_i\ PWE_{i,t}*E_{i,t}+FSAV_t+FAIDGIN_t+FAIDNGO_t+REMIT_t$	Current account balance
(D57)	$SAVING_t$	=	$PINVEST_t+WALRAS1_t$	Savings-investment equilibrium
Factor updating equations				
(D58)	$FS_{f,t}$	=	$(1+FSgr_{f,t})*FS_{f,t-1}$	Factor supply updating
(D59)	$FSgr_{"capit",t}$	=	$(((1-deprate_t)*FS_{"capit",t}+$ $capscale_t*3_i(PC_{i,t-1}*ID_{i,t-1}/PK_{t-1}))/FS_{"capit",t})-1$	Capital supply growth rate
(D60)	PK_t	=	$3_i\ pkshr_i*PC_{i,t}$	Price of capital goods
Financial sector equations				
(D61)	$INFP_t$	=	$IRFP_t*NFDP_t$	Private foreign interest payments
(D62)	$INFG_t$	=	$IRFG_t*NFDG_t$	Government foreign interest paym.
(D63)	$CURBAL_t$	=	$-FSAV_t-INFP_t$	Current account balance
(D64)	$FAIDGIN_t$	=	$NTRG_t-INFG_t$	Foreign aid in government budget
(D65)	SP_t	=	$HHSAV_t+ENTSAV_t-EXR_t*INFP_t$	Private savings
(D66)	SG_t	=	$GRESAV_t-EXR_t*INFG_t$	Government savings
(D67)	$(NFDG_t-NFDG_{t-1})$	=	$g_t*3_i(PWE_{i,t}*E_{i,t}-PWE_{i,t-1}*E_{i,t-1})$	Govt. net foreign debt relationship
(D68)	R_t-R_{t-1}	=	$d_t*3_i(PWM_{i,t}*M_{i,t}-PWM_{i,t-1}*M_{i,t-1})$	Foreign exchange reserve accumulation relationship
(D69)	MD_t	=	$(1/v_t)*PINDEX_t*RGDP_t$	Money demand relationship
(D70)	R_t-R_{t-1}	=	$(NFDP_t-NFDP_{t-1})+(NFDG_t-NFDG_{t-1})+CURBAL_t$	Foreign capital market account
(D71)	$PINVEST_t-SP_t$	=	$(DCP_t-DCP_{t-1})+EXR_t*(NFDP_t-NFDP_{t-1})+$ $(EXR_t-EXR_{t-1})*R_{t-1}-(MD_t-MD_{t-1})$	Private investment account
(D72)	MD_t-MD_{t-1}	=	$(EXR_t*R_t-EXR_{t-1}*R_{t-1})-(DCP_t-DCP_{t-1})+(DCG_t-DCG_{t-1})$	Domestic capital market account
Macroeconomic aggregates definitions				
(D73)	$PCONS_t$	=	$3_i\ PC_{i,t}*CD_{i,t}$	Total household consumption
(D74)	$PINVEST_t$	=	$3_i\ PC_{i,t}*CI_{i,t}$	Total private investment
(D75)	$GCONS_t$	=	$3_i\ PC_{i,t}*GD_{i,t}$	Total government consumption
(D76)	$GINVEST_t$	=	$3_i\ PC_{i,t}*GI_{i,t}$	Total government investment
(D77)	$NGOCONS_t$	=	$3_i\ PC_{i,t}*NGOD_{i,t}$	Total NGO consumption
(D78)	$CONS_t$	=	$PCONS_t+GCONS_t+NGOCONS_t$	Total consumption
(D79)	$INVEST_t$	=	$PINVEST_t+GINVEST_t$	Total investment
(D80)	$EXPORT_t$	=	$EXR_t*3_i\ PWE_{i,t}*E_{i,t}$	Total exports
(D81)	$IMPORT_t$	=	$EXR_t*3_i\ PWM_{i,t}*M_{i,t}$	Total imports

Appendix E:

Merged model 'real' side variables in a SAM framework								
Receipts								
	1. Production sector	2. Private sector	3. Govt. Recurrent	4. Govt. Investment	5. NGO	6. Capital	7. Rest of World	8. Total
1. Production		P*CP	P*CG	P*IVG	P*CN	P*IVP	E*XPI*X	Net Commodity Demand
2. Private sector	GDP		GT				E* (NFP +NTRP)	Private Income
3. Govt. Recurrent		TG						Govt. Recurrent Receipts
4. Govt. Investment							E*(NTRG -INFG)	Govt. Aid Receipts
5. NGO							E* NTRNGO	NGO Aid Receipts
6. Capital		SP +E*INFP	SG + E*INFG	- BRG-SG			E*(-INFP -CURBAL)	Total Savings
7. Rest of World	E*MPI*M							Imports
8. Total	Net Commodity Supply	Private Income Allocated	Govt. Recurrent Expenditure	Govt. Investment	NGO Expenditure	Private Investment	Foreign Exchange Available	

Note: variable names are defined in the appendix.

Merged model 'financial' side variables in a SAM framework							
Liabilities	Assets						
	1. Domestic Money Market	2. Foreign Capital Market	3. Private Investment	4. Government Investment	5. Capital Gains	6. Capital	7. Total
1. Domestic Money Market			MD				Money Demand
2. Foreign Capital Market	E* R					-E*CURBAL	Demand for Foreign Currency
3. Private Investment	DCP	E* NFDP			E*R(-1)	SP	Demand for Private Assets
4. Government Investment	DCG	E* NFDG				SG + E*NTRG	Demand for Government Assets
5. Capital Gains	E*R(-1)						Revaluation of Forex Reserves
6. Capital			P*IVP	P*IVG			Total Investment
7. Total	Money Supply	Supply of Foreign Currency	Supply of Private Assets	Supply of Government Assets	Revaluation of Forex Reserves	Total Savings	

Note: variable names are defined in the appendix.

Appendix F:

CGE model variables in a SAM framework

Receipts	Expenditures											
	1. Activities	2. Commodities	3. Factors	4. Enterprises	5. Households	6. Recurrent Government	7. Indirect Taxes	8. Government Investment	9. NGO	10. Capital	11. Rest of World	12. Total
1. Activities		PDC*DC			PDCH*DCH							Total Sales
2. Commodities	PC*INT				PC*CD	PC*CG	-EXPTAX	PC*GI	PC*NGOD	PC*CI	PE*E	Total Marketed Commodities
3. Factors	WF*FDSC											Value Added at Factor Cost
4. Enterprises			$(1-TF_{cap})$* $WF*FDSC_{cap}$			GOVTE						Enterprise Income
5. Households			$(1-TF_{lab})$* $WF*FDSC_{lab}$	DISTR		GOVTH					EXR*REMIT	Household Income
6. Recurrent Government		CONTAX	FACTAX	ENTTAX	HHTAX		INDTAX+ TARIFF+ EXPTAX					Government Recurrent Receipts
7. Indirect Taxes	INDTAX	TARIFF										Tariffs plus Output Taxes
8. Government Investment											EXR* FAIDGIN	Government Aid Receipts
9. NGO											EXR* FAIDNGO	NGO Aid Receipts
10. Capital				ENTSAV	HHSAV	GRESAV		GINSAV			EXR*FSAV	Total Savings
11. Rest of World		PM*M										Imports
12. Total	Total Payments	Total Commodity Supply	Value Added at Factor Cost	Enterprise Expenditure	Household Income Allocated	Tax Financed Government Expenditure	Indirect Tax Receipts less Export Subsidies	Government Investment*	NGO Consumption	Non-Government Investment	Foreign Exchange Available	

Note: variable names are defined in the appendix.

Appendix G:

Merged model variables

CP	Private real consumption
CG	Government real consumption
CN	NGO rela consumption
IVP	Private real investment
IVG	Government real investment
X	Real exports
M	Real imports
GDP	real GDP
TG	Government transfers to the private sector
GT	Government tax revenues
BRG	Government borrowing requirement
SP	Private savings
SG	Government savings
INFP	Private net foreign interest payments
INFG	Government net foreign interest payments
NFP	Net factor payments
NTRP	Private net foreign transfers from abroad
NTRG	Government net foreign transfers from abroad
NTRNGO	NGO net transfers from abroad
CURBAL	Current account balance
DCP	Private domestic credit taking
DCG	Government domestic credit taking
R	Foreign exchange reserve holdings
MD	Money stock
NFDP	Private net foreign debt
NFDG	Government net foreign debt
PD	GDP deflator
P	Absorption deflator
XPI	World market price deflator for exports
MPI	World market price deflator for imports
E	Exchange rate

CGE model variables

CD	Private real consumption
CG	Government real consumption
NGOD	NGO rela consumption
CI	Private real investment
GI	Government real investment
E	Real exports
M	Real imports
INT	Real intermediate consumption
DC	Marketed production
DCH	Home consumed production
FDSC	Factor demand
DISTR	Distributed profits
GOVTE	Government transfers to enterprises
GOVTH	Government transfers to households
INDTAX	Indirect taxes
CONTAX	Consumption taxes
FACTAX	Factor taxes
ENTTAX	Enterprise taxes
HHTAX	Household taxes
EXPTAX	Export taxes
TARIFF	Import tariffs
ENTSAV	Enterprise savings
HHSAV	Household savings
GRESAV	Government recurrent budget savings
GINSAV	Government investment budget savings
REMIT	Remittances from workers abroad
FAIDGIN	Foreign aid in the government budget
FAIDNGO	Foreign aid in the NGO budget
FSAV	Foreign savings
PDC	Retail price
PDCH	Farm gate price
PC	Consumer price
PE	Export price in domestic currency
PM	Import price in domestic price
EXR	Exchange rate

Table 1. Final Demand (percentage changes)

Variable	1997	1998	1999	2000	2001	2002
Consumption	8.8	9.4	8.8	8.2	8.1	8.3
Private consumption	6.8	9.0	8.8	8.9	9.1	9.2
Government consumption	34.2	15.5	11.6	5.4	3.5	3.8
NGO consumption	-11.1	-2.9	-2.9	-2.9	-3.0	-3.0
Investment	11.7	7.6	7.9	10.0	10.4	10.0
Private investment	2.7	9.3	9.9	13.9	14.4	13.4
Government investment	21.8	6.0	6.0	6.0	6.0	6.0
Exports	-2.0	12.2	12.7	13.2	13.7	13.8
Imports	-3.3	9.3	9.1	9.2	9.4	9.5
GDP	12.5	9.4	9.2	9.3	9.4	9.5

Table 2. Balance of Payments (percent of GDP)

Variable	1997	1998	1999	2000	2001	2002
Resource balance	-15.9	-15.5	-15.0	-14.4	-13.7	-13.0
Export	15.6	16.0	16.5	17.1	17.8	18.5
Import	31.6	31.6	31.6	31.6	31.6	31.6
Net factor service income	-1.2	-1.7	-1.7	-2.2	-2.1	-2.1
Net factor payments	1.5	1.3	1.2	1.0	0.9	0.8
Private foreign interest payments	1.0	0.5	0.7	1.4	1.3	1.3
Govt. foreign interest payments	1.7	2.5	2.2	1.9	1.7	1.6
Net transfers	12.7	11.6	74.7	66.6	8.7	7.9
Private net transfers	0.0	0.0	0.0	0.0	0.0	0.0
Govt. net transfers	10.1	9.3	72.7	64.8	7.1	6.5
NGO net transfers	2.6	2.3	2.0	1.8	1.6	1.4
Current account balance	-4.5	-5.6	58.0	50.0	-7.2	-7.2
ΔPrivate net foreign debt	13.0	2.8	3.1	3.6	3.4	3.3
ΔGovt. net foreign debt	5.9	4.3	-59.6	-52.2	5.2	5.4
ΔForeign exchange reserves	14.4	1.5	1.4	1.5	1.5	1.5

Table 3. Government budget (percent of GDP)

Variable	1997	1998	1999	2000	2001	2002
Govt. tax revenue	14.4	14.4	14.4	14.4	14.4	14.4
Govt. net foreign transfers	10.1	9.3	72.7	64.8	7.1	6.5
Govt. consumption	10.2	10.8	11.0	10.6	10.1	9.6
Govt. investment	15.2	14.7	14.3	13.9	13.5	13.1
Govt. transfers	1.4	1.2	1.1	1.0	1.0	0.9
Govt. foreign interest payments	1.7	2.5	2.2	1.9	1.7	1.6
Govt. borrowing requirement	3.9	5.6	-58.4	-51.8	4.7	4.1
ΔGovt. domestic credit	-2.0	1.2	1.2	0.4	-0.5	-1.3
ΔGovt. net foreign debt	5.9	4.3	-59.6	-52.2	5.2	5.4

Table 4. Money supply (percent of GDP)

Variable	1997	1998	1999	2000	2001	2002
Private domestic credit	17.0	17.0	17.0	17.8	19.5	21.8
Govt. domestic credit	-4.4	-2.6	-1.0	-0.5	-1.0	-2.1
Foreign exchange reserves	28.8	27.0	25.5	24.1	22.9	21.8
Money supply	41.5	41.5	41.5	41.5	41.5	41.5

Table 5. Price indices (percentage changes)

		1998	1999	2000	2001	2002
Producer prices	Agriculture	9.6	8.1	8.1	8.2	8.3
	Industry	4.1	4.4	4.3	4.2	4.2
	Ordinary services	4.4	4.6	4.4	4.3	4.3
	Marketing services	2.8	3.5	3.4	3.3	3.3
Consumer prices	Agriculture	6.8	6.3	6.3	6.4	6.5
	Industry	4.2	4.6	4.6	4.6	4.6
	Ordinary services	4.5	4.7	4.6	4.5	4.5
Exch. rate		2.5	2.8	3.0	3.1	3.1

Table 6. Domestic world market prices (percentage changes)

		1998	1999	2000	2001	2002
Import prices	Agriculture	4.7	5.1	5.3	5.3	5.3
	Industry	4.7	5.1	5.3	5.4	5.3
	Ordinary services	5.5	5.8	6.1	6.2	6.2
Export prices	Agriculture	7.6	7.5	7.9	8.0	8.0
	Industry	6.1	6.3	6.5	6.7	6.7
	Ordinary services	5.5	5.8	6.1	6.2	6.2

Table 7. Factor returns (percentage changes)

	1998	1999	2000	2001	2002
Agricultural labor	13.7	12.7	12.9	13.1	13.2
Non-agricultural labor	11.6	11.5	11.4	11.5	11.6
Capital	2.4	4.9	5.1	5.0	4.7

Table 8. Equivalent variation (% of base income)

	Base income	1998	1999	2000	2001	2002
Urban households	121.0	8.6	15.7	21.6	26.5	30.5
Rural households	113.0	8.0	14.4	19.8	24.1	27.4